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Determination of frequency characteristics of accumulator power sources - includes passage of non-sinusoidal periodic voltage to battery, breakdown of voltage and current into harmonic Fourier series and measurement of amplitude and initial phase

SIBE MINING METAL ACAD 95.06.06 95RU-109340

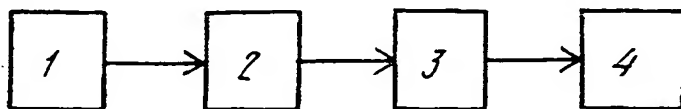
X16 (97.08.27) H01M 10/48, G01R 31/36

The non-sinusoidal voltage and current applied from a source (1) to a battery are formed and are broken down into a harmonic Fourier series and the amplitude and initial phase of the voltage are measured, while the harmonic phases are used to determine the complex resistance of the battery for each harmonic and the active and reactive components.

Knowing the frequency characteristics of the source, its working fitness, the mechanical condition and degree of charging of the power source are fixed using an analogue-digital converter (3) and a computer (4).

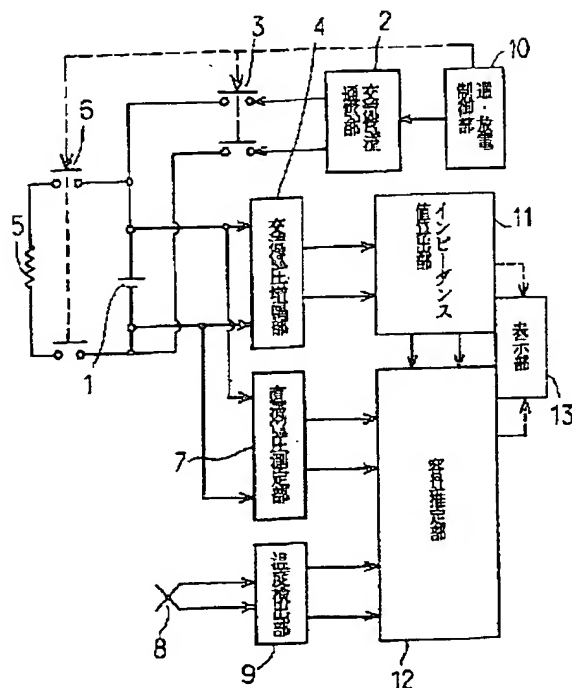
USE - Determination of frequency characteristics of accumulator power source.

ADVANTAGE - Determination of amplitude-frequency and phase-frequency characteristics of all types of accumulator. (3pp Dwg.No.1/2)



## Patent Abstracts of Japan

TITLE : APPARATUS FOR DETECTING LIFE  
OF SEALED LEAD STORAGE  
BATTERY



**ABSTRACT :** PROBLEM TO BE SOLVED: To exactly detect the life of a sealed lead storage battery by accurately estimating the discharge capacity of the battery without being influenced by a ripple voltage or temperatures.

**SOLUTION:** An A.C. of a constant frequency is supplied to a battery 1 to be measured from an A. C. feed part 2 for a predetermined time. Only an A.C. voltage component of the same frequency as that of the A.C. is detected from a terminal voltage of the battery 1 and amplified at an A.C. voltage amplification part 4. A voltage response waveform output from the amplification part 4 is Fourier-transformed at an impedance calculation part 11, thereby, an amplitude of the A.C. voltage component of the same frequency as that of the supplied current is detected. Impedance value of the battery is calculated from the amplitude. A D.C. voltage and a surrounding temperature of the battery 1 when the battery 1 is discharged through a discharge load resistor 5 for a predetermined time are measured. The discharge capacity is estimated by a capacity estimation part 12 on the basis of values obtained by correcting, with the surrounding temperature of the battery, the impedance value of the battery 1 and the voltage of the battery after discharged for the predetermined time to detect the life of the battery.

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# EUROPEAN PATENT OFFICE

## Patent Abstracts of Japan

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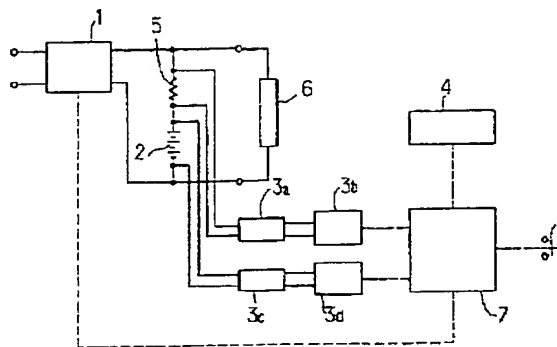
APPLICATION DATE : 08-08-96  
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APPLICANT : SHIN KOBE ELECTRIC MACH CO LTD;

INVENTOR : HIRONAKA KENSUKE;

INT.CL. : H02J 7/10 G01R 27/02 G01R 31/36  
G05F 1/10 // H01M 10/48

TITLE : POWER SUPPLY EQUIPPED WITH  
SEALED LEAD-ACID BATTERY



ABSTRACT : PROBLEM TO BE SOLVED: To provide a power supply equipped with sealed lead-acid batteries which enables the impedance inside the sealed lead-acid batteries to be measured precisely without providing an exclusive AC current conducting part.

SOLUTION: As a charging equipment 1 for charging sealed lead-acid batteries 2 by the floating charge, a charger is used in which an output voltage is changed over to an ordinarily set voltage or a voltage lower than the former one with a constant frequency. When the output voltage of the charging equipment 1 is low, a discharging current is caused to flow from the sealed lead-acid batteries 2 via a load 6 and a shunt resistance 5. From the wave form of the discharging current outputted by the sealed lead-acid batteries 2 at this time and the wave form of their voltage response, the Fourier transform values having the constant frequency above as a basic frequency are obtained by a first and second Fourier transforming means comprising a microprocessor 7. From these transform values, inside impedance is obtained by an impedance calculating means made up of the microprocessor 7. Then, a displaying part 4 displays the result of judgment of the deteriorated state of the sealed lead-acid batteries 2 based on this inside impedance.

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